

**H-1112-1 SAFETY AND HEALTH MANAGEMENT**

**Safety and Health Program  
Ergonomic Protection Program**

**United States Department of the Interior  
BUREAU OF LAND MANAGEMENT  
OREGON STATE OFFICE**

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**SAFETY AND HEALTH PROGRAM  
ERGONOMIC PROTECTION PROGRAM**

**OR/WA Supplement to BLM Manual Handbook H-1112-1  
Safety and Health Management**

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## H-1112-1 SAFETY AND HEALTH MANAGEMENT

### 16.9.1 Policy Statement

The Oregon/Washington Bureau of Land Management (BLM) is committed to providing a safe and healthful work environment for all employees. The agency has various safe work procedures in place involving administrative and engineering controls, work practice design, and requirements for the use of personal protective equipment (PPE) which assist in reducing employee exposure to hazards on the job.

Employees spend many hours a year in the workplace. Not surprisingly, all of these hours can take a toll on the back and other extremities, in addition to increasing eye strain. Additionally, poorly designed working environments can contribute to reduced efficiency, decreased production, loss of income, increased medical claims, and possible permanent disability. In fact, musculoskeletal disorders are the number one cause of lost work time throughout this country.

Ergonomics is the science of fitting jobs to people. That is, it is a way of designing workstations, work practices, and the workforce to accommodate the capabilities of workers in order to reduce risk factors known to contribute to occupational ergonomic injuries and illnesses such as sprains and strains and cumulative trauma disorders (CTDs). Ergonomics encompasses the body of knowledge about physical abilities and limitations as well as other human characteristics that are relevant to job design. Good ergonomic design makes the most efficient use of worker capabilities while ensuring that job demands do not exceed those capabilities. OR/WA Districts may use this program as basic guidance and supplement as necessary.

Primary applicable standards, manuals and handbooks are listed below:

- 29 CFR 1910.60 *Basic Program Elements for Federal Employee Occupational Safety and Health Programs*
- Department Manual Part 485 – Safety and Occupational Health Program
- BLM Manual Section 1112 – Safety
- BLM Manual Handbook 1112-1 Safety and Health Management

### 16.9.2 Occupational Safety & Health Administration [OSHA] Guidance

Currently, no specific Federal OSHA standards or regulations exist regarding ergonomic stressors. However, OSHA has created a four-pronged comprehensive approach to ergonomics designed to quickly and effectively address musculoskeletal disorders (MSDs) in the workplace. The four segments of this strategy for reducing these injuries and illnesses are:

- Guidelines – OSHA has and will continue to develop industry or task-specific guidelines for a number of industries based on current incidence rates and available information about effective and feasible solutions. Guidelines have already been issued for various industries such as retail grocery, poultry and meatpacking plants and nursing homes.

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- Enforcement – OSHA will conduct inspections for ergonomic hazards and issue citations under the General Duty Clause which correlates with 1960.8 for Federal Agencies. OSHA will also issue ergonomic hazard alert letters where appropriate.
- *The enforcement plan for ergonomics focuses on industries and employers with known high injury and illness rates related to ergonomic hazards. OSHA coordinates inspections with a legal strategy designed to target prosecutable ergonomic violations. Serious ergonomics hazards will be addressed using 29CFR 1960.8 Basic Program Elements for Federal Employees [OSHA B]. Agency responsibilities, "...shall furnish to each employee employment and a place of employment which is free from recognized hazards that are causing or are likely to cause death or serious physical harm." This clause from the OSH Act is utilized to cite serious hazards where no specific OSHA standard exists to address the hazards, as is the case with ergonomic stressors.*
- Outreach and Assistance – OSHA provides assistance to Federal agencies and businesses which allows them to proactively address ergonomic issues in the workplace. Resources include OSHA Ergonomic eTools, case studies, cooperative programs, training and education. Links to each may be found at <http://www.osha.gov/SLTC/ergonomics/outreach.html>.
- National Advisory Committee on Ergonomics [NACE] – This committee advised the Assistant Secretary of Labor for OS&H on ergonomic guidelines, research, outreach and assistance. The committee work effort was completed in November 2004. The committee provided advice in areas such as information related to various industry or task-specific guidelines, identification of gaps in the existing research base related to applying ergonomic principles to the workplace and current and projected research needs and efforts. More specific information regarding the work of this committee may be found at [http://www.osha.gov/SLTC/ergonomics/nat\\_advis\\_comm.html](http://www.osha.gov/SLTC/ergonomics/nat_advis_comm.html).

Both Oregon and Washington have adopted state ergonomic standards and/or guidelines to supplement the OSHA guidelines.

Washington State adopted an ergonomics standard in 2000 which was subsequently repealed in 2003. In response to the repeal, the state is concentrating on educating workers and employers on the importance of preventing ergonomic injuries and proper techniques that can be established. Ergonomics information and outreach materials are available at the following site:

<http://www.ini.wa.gov/safety/topics/hazardinfo/ergonomics/about/default.asp>.

The State of Oregon created a strategic plan which includes activities designed to reduce musculoskeletal injuries through outreach and the use of voluntary service. An ergonomics stakeholder group was developed to promote the reduction of ergonomic injuries in targeted industries with high rates of musculoskeletal injuries. The OR-OSHA site offers a variety of ergonomics related services including conferences, on-line training, educational resources, and consultation services to assist Oregon employers. An ergonomics web page was created at

<http://www.cbs.state.or.us/external/osha/consult/ergonomic/ergonomics.htm>.

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### 16.9.3 General Information - Ergonomics

Sprains and strains from overexertion are the top injuries in most workplaces. Often, these injuries happen when the demands of the job are greater than the capabilities of an employee. Ergonomics is the science and art of fitting the job to the employee's needs. The ultimate goal of ergonomics is to design the workplace so that it accommodates the variety of human capabilities and limitations to *prevent* musculoskeletal disorders. While designing [engineering] ergonomic hazards out of the workplace is the goal, other measures such as the administrative controls and changes to work practices are often more feasible initially.<sup>1</sup>

Perhaps the most commonly discussed workplace injury of the last decade has been carpal tunnel syndrome and related maladies of the wrist and hand. Although typewriters have been in use for more than 100 years in this county, the popularity of the computer – with intensive keyboard use for data entry and word processing – has given rise to a generation at risk for such injuries. Carpal tunnel syndrome and related disorders (including tendonitis, trigger finger, hand-arm vibration disease) are a part of a group of illnesses known as cumulative trauma disorders [CTDs]. CTDs are a family of muscle, tendon, and nerve disorders that are caused, accelerated, or aggravated by repeated movements of the body, particularly when awkward postures, high forces, contact stresses, vibration, and/or exposure to cold are evident. The elbows, shoulders, neck, and back are also subject to CTDs.

Cumulative trauma disorders are not fatigue. Though it is a potential contributing factor, fatigue is classified as tiredness, physical stress, and discomfort that subside a few minutes or hours after the activity stops. Repeated and sustained activities that might potentially cause long-term problems usually cause fatigue as well. Although being weary after performing certain job tasks certainly has an effect on work performance and daily living, and may even cause pain, fatigue is not considered a serious medical problem. As a general rule, symptoms that persist after a night of rest or interfere significantly with work or daily activities indicate something more serious than fatigue. At this point, a health care provider should be contacted and the issue reported to the supervisor. It is feasible that the work environment or equipment may be adjusted to assist in alleviating the problem.

The hands, wrists, arms, shoulders, neck and back are comprised of a complex network of nerves, bones, tendons, and fluid. Irritation of these tissues during certain work activities can, over time, result in elevated fluid pressure around nerves. This can cause compression and may eventually cause nerve damage. Nerves can also be damaged by the presence of inflamed tendons. Carpal tunnel syndrome is a common example of this: the median nerve in the wrist becomes compressed and ultimately damaged as tendon structures swell. A chief cause of this type of CTD is repeated work involving high force or the use of a bent or extended wrist.

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<sup>1</sup> Engineering controls may include workstation redesign, tool and handle redesign, or a change of work methods. Administrative/work practice controls can include job rotation, reduction of repetitions, and preventive maintenance on related equipment, specific training, and monitoring to reduce ergonomic stressors. Reference [Section 16.9.4](#) for further information regarding various types of hazard prevention controls.

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Unfortunately, since repetition is one of the key factors in causing CTDs, non-work related activities, such as needlework, gardening, fly-casting, woodworking and bowling, can also affect the progress of the illness and recovery time. All of these activities may aggravate CTDs. This can make it difficult at times to identify the main cause of a CTD. Risk factors for CTDs, as noted above, can occur in a variety of occupations, thus each task must be evaluated for each of the risk factors. Some occupations have combinations of stresses, such as prolonged contact stresses and posture.

Specialists in the science of ergonomics offer numerous solutions to make the workplace a more hospitable environment for employees. Cumulative trauma disorders and lower back injuries in particular have received considerable attention. There are six major CTD risk factors:

- Repeated actions and sustained postures
- Forceful Actions [lifting, carrying, hoisting, pushing, etc]
- Prolonged contact stresses from tools and equipment
- Posture
- Vibration
- Cold Temperature

One of the most frequent complaints by employees who must spend a significant amount of time in front of a monitor is eyestrain. Additional information regarding computer use is discussed in [Appendix A](#) and [Illustration 3](#).

### 16.9.4 Telecommuting

Telework has now become an important work option for many employees. With portable computers and high speed communication links, employees today can work almost anywhere at least some of the time. Using the flexibility to work in a home office has become an important part of work planning. The Office of Personnel Management [OPM] and the General Services Administration [GSA] have established a joint web site on Telework to provide access to guidance issued by both agencies. The site provides a link to the OPM Guide *Telework: A Management Priority, A Guide for Managers, Supervisors, and Telework Coordinators* which provides sample checklists and surveys. Appendix J of the Guide [Reference [Illustration 4-1](#)] lists recommended safety guidelines for the home work space.

### 16.9.5 Hazard Prevention

Engineering Controls – These types of controls are the preferred method of controlling ergonomic stresses. The following controls should be considered when designing a work station or recommending corrective measures. Work stations should be designed to accommodate the individual who actually works at a given station and not for an average or typical employee.

- Work stations should be designed so that the station can be adjusted easily to accommodate the employee assigned to the station and the equipment used at the station designed for that purpose
- The work station should be sized to allow for the full range of movements required to perform assigned tasks
- Tasks performed by the employee in the performance of his/her responsibilities should be designed to prevent

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- Tools used in the performance of assigned tasks should be designed to prevent or reduce the chronic muscle contraction; awkward finger, hand and arm positions; repetitive forceful motions; vibration; and excessive gripping, pinching or pressing with the hand and fingers

Administrative Controls – The following identifies basic administrative controls that, when applied, will be beneficial in the reduction of exposure, duration, frequency and severity of exposure.

- Reduce the number of repetitive motions
- Reduce the force or physical exertion applied to any part of the body
- Rotate employees to different tasks [Note: When rotating an employee to a different task, that new task must use a different group of muscles, tendons and nerves.]

Work Practice Controls – An effective program for ergonomic hazard prevention and control also includes procedures for safe and proper work practices that are understood and followed by manager, supervisor and employees. These types of controls include the following:

- Proper work techniques
- Employee training
- Good housekeeping efforts

Personal Protective Equipment [PPE] – PPE such as gloves, padding, clothing or equipment should be designed for the intended purpose. If, as part of the evaluation, it is recommended by the consultant that personal protective equipment is needed, several sources should be referenced. However, every effort should be made to first resolve any issues using engineering and/or administrative controls. [Note: Braces, splints and back belts are not considered personal protective equipment. The employee should consult with their personal health care provider before using any of these items.]

### **16.9.6 Purpose and Scope**

The purpose of this program is to provide basic guidance and ergonomic resources for managers and employees to assist in preventing the occurrence of work-related musculoskeletal disorders [WMSD], primarily those in the back and upper and lower extremities. Supervisors and employees will be provided information to increase their awareness of ergonomic issues and to enable them to more easily identify these hazards. By eliminating WMSDs for employees, a resulting reduction in worker compensation costs should be realized. A referral process is available to ensure that employees are provided a professional ergonomic evaluation if requested.

This program is applicable to any employee who may be subject to repetitive motion, cumulative trauma, or vibrating equipment during the course of the workday that may cause damage to the musculoskeletal system.

The State Office currently refers ergonomic evaluation requests to SITUS® Ergonomics Northwest, LLC. [503.358-2269] Additional ergonomic resources exist in the Portland Metropolitan area and throughout Oregon and Washington State.

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### 16.9.7 Responsibilities and Procedures

The Safety Manager is the point of contact for the Ergonomic Protection Program. Employees are assured a prompt response to reports and recommendations. A professional work site evaluation will be arranged for the employee when requested.

It is critical that managers and supervisors demonstrate commitment and support of the Ergonomics Protection Program by ensuring that employees are provided basic information regarding ergonomic issues and are encouraged to immediately report any concerns they may have. A variety of resources are included in this document. In addition, several PowerPoint® presentations on various ergonomic-related subjects can be found on the safety website at <http://web.or.blm.gov/safety>. Employees are strongly encouraged to take an active role in learning to recognize the signs and symptoms of WMSD and to report any concerns to the supervisor in a timely manner.

### 16.9.8 Ergonomic Awareness Training

Training in ergonomic awareness and safe work practices is the key in ultimately reducing injuries and illnesses. Supervisors and employees will be provided information to increase their awareness of ergonomic issues and to enable them to more easily identify these hazards as well as to assist in modifying and/or improving the job tasks so that the potential for causing musculoskeletal injuries becomes negligible. At a minimum, the following information will be provided

- The general principles of ergonomics
- How to recognize the signs and symptoms of WMDSs, and the importance of early reporting of these symptoms
- How to identify hazards that are reasonably likely to be causing or contributing to WMDSs
- Procedures for early reporting of signs and symptoms of WMDS and related hazards
- Encouragement to make recommendations to resolve issues

Information delivery methods include this written program, website references, awareness training sessions [conducted by a qualified health care provider], and various self-instructional materials.

### 16.9.9 Program Delivery, Evaluation and Records Management

All engineering controls will be designed by a professional ergonomic consultant and may include workstation redesign, tool and handle redesign and/or suggestions for a change of work methods. The consultant will provide the results of the written evaluation to the employee. The employee will consult with the supervisor in order to affect a solution for the ergonomic concern. Confidentiality will be maintained regarding any medical condition identified during the evaluation process. The cost of the ergonomic evaluation and any associated equipment purchases will be borne by the requesting branch.

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The Ergonomics Protection Program will be evaluated annually by the Safety Manager to determine if employees who report issues are receiving assistance in a timely manner. Follow up to determine resolution of the ergonomics issue(s) will occur.

There are no OSHA-specific record-keeping requirements for an ergonomics program. Employees are strongly encouraged to retain the written ergonomic evaluation received from the consultant for future reference and possible revision of work methods. A copy of the evaluation should be retained in a confidential employee folder in personnel.



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**Administrative Controls** – These are changes in the way that work in a job is assigned or scheduled that reduce the magnitude, frequency or duration of exposure to ergonomic risk factors. Examples include employee rotation, job task enlargement, alternative tasks, and employer-authorized changes in work pace.

**Bursitis** – Inflammation of a bursa. Bursae are fluid filled sacs that provide slipperiness between tendons and ligaments and adjacent bones.

**Carpel Tunnel Syndrome** – Pressure of swollen tissue entrapping the median nerve as it passes through the carpal tunnel. *Carpus* is Latin for “wrist.”

**Cumulative Trauma Disorders (CTDs)**  
These include disorders of the soft tissues, such as muscles, tendons, ligaments, joints, blood vessels, and nerves – that result from repetitive motion trauma. These include the following: carpal tunnel syndrome, tendonitis, bursitis, rotator cuff syndrome, and back strain/sprain

**Degenerative Disc Disease** – Breakdown of the discs, (which act as shock absorbers) that separate the vertebrae.

**Engineering Controls** – These are physical changes to a job that eliminate or materially reduce the presence of MSD hazards. Examples of these controls include changing, modifying, or redesigning the workstations, tools, facilities, equipment, materials or processes.

**Ergonomics** – The science of fitting jobs to people. Ergonomics encompasses the body of knowledge about physical abilities and limitations as well as other human characteristics that are relevant to job design. Ergonomic design is the application of this body of knowledge to the design of the workplace (i.e., work tasks, equipment, and environment) for safe and efficient use by workers.

**Ergonomic Risk Factors** – Aspects of a job that pose a biomechanical stress to the workers: force, repetition, awkward postures, static postures, contact stress, vibration and cold temperatures

**Hand-Arm Vibration Levels** – Levels caused by vibrating tools or equipment that go through the hand, and then travel through the rest of the body.

**Intensive Keying** – Keyboard work with the hands or fingers in a rapid, steady motion with few opportunities for temporary work pauses.

**Musculoskeletal Disorders (MSDs)** – These involve soft tissues as identified in the CTD definition. Examples include muscle strains and tears, ligament sprains, joint and tendon inflammation, pinched nerves and degeneration of spinal discs.

**Work-Related Risk Factors** – These may include use of tools, equipment, tasks, work methods, work processes, the work environment, the duration of the job task, and other aspects of work performance or organization.

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**Ergonomic Information Websites**

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**Government Sites**

American Industrial Hygiene Association

<http://www.aiha.org/SplashPages/html/topic-ergonomics.htm>

This site provides a wealth of information on ergonomics, including links to a variety of websites.

National Institute for Occupational Safety and Health [NIOSH]

<http://www.cdc.gov/niosh/topics/ergonomics/>

This site provides information and studies on ergonomics and musculoskeletal disorders.

Occupational Safety and Health Administration (OSHA)

<http://www.osha-slc.gov/SLTC/ergonomics/index.html>

This site provides a variety of information and training tools.

Oregon OSHA

<http://www.cbs.state.or.us/external/osha/>

OR-OSHA provides web materials and on-line ergonomic classes as well as a variety of information

Washington State Department of Labor and Industries

<http://www.lni.wa.gov/Safety/Topics/Ergonomics/default.asp>

This site contains information and links to services, resources and evaluation tools.

Human Factors and Ergonomics Society

<http://www.hfes.org>

Interagency Telework Site

[www.telework.gov](http://www.telework.gov)

**Medical Institution Sites**

Oregon Health & Sciences University (OHSU)

Center for Research on Occupational and Environmental Toxicology (CROET)

<http://www.croetweb.com/links.cfm?topicID=14> [general information]

<http://www.croetweb.com/links.cfm?topicID=4> [back injuries]

<http://www.croetweb.com/links.cfm?topicID=28> [office ergonomics]

<http://www.croetweb.com/links.cfm?topicID=55> [worksite solutions]

Washington University School of Medicine

<http://mednews.wustl.edu/medadmin/panews.nsf>

## References 1-2

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#### **Educational Institution Sites**

A Survival Guide to Computer Workstations

<http://www.ehs.ohio-state.edu/textver.asp?page=ohse.computer>

Ergonomic Guidelines for Computer Use – Harvard

<http://www.hsph.harvard.edu/ccpe/programs/egcu.shtml>

Ergonomic Guidelines for Workstation Setup- Radcliff Institute

<http://www.radcliffe.edu/rito/tips/ergonomics.html>

Ergonomic Product Guidelines

[http://www.cccd.edu/ehs/ergo/html/products\\_guide.html](http://www.cccd.edu/ehs/ergo/html/products_guide.html)

Cornell University Ergonomic Web

<http://ergo.human.cornell.edu/cuinterest.html>

University of California Berkeley Ergonomics

<http://www.uhs.berkeley.edu/facstaff/ergonomics/index.htm>

#### **Other Sites and Resources**

Ergonomic Center

<http://www.ergonomiccenter.com>

Ergo-Web

<http://www.ergoweb.com>

Healthy Computing

<http://www.healthycomputing.com>

Painless Gains – The Office Ergonomics Safety Program

<http://www.painlessgains.com>

This site provides self-study materials.

Human Factors and Ergonomics Society

<http://www.hfes.org>

State Safety Office – OR950

Office Ergonomic Tool Kit [A self assessment including a video, DVD, and employee guide.]

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### **General Guidelines for Making Your Computer “User-Friendly”**

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Computer workstations, including the components of monitors, keyboards, and chairs, present a whole set of problems in addition to cumulative trauma disorders (i.e., forceful actions – lifting, carrying, hoisting, pushing; prolonged contact stresses from tools and equipment; repeated actions and sustained postures; vibration; and cold temperature.) The explosive growth in the use of computers over the last 25 years has led to a special group of ergonomic dilemmas unique to this use. For instance, the screen introduces new lighting and vision considerations. Many computer jobs offer few opportunities for alternate activities or postures, and, thanks to the fluidity of computer keyboards compared to typewriters, workers can key faster and for longer uninterrupted stretches than ever before.

In addition, some people who use computers are concerned about the effects of heat and electrostatic and electromagnetic fields in the immediate vicinity of their terminals. And, working at computers is sometimes associated with psychological stress, either because of the technology itself or because of job conditions associated with the work. As computers spread from the office to the factory to the fast food restaurant, workers and their employers need to be aware of these problems in order to avoid them. By following and applying some of the recommendations below, computers can be time-saving and labor-enhancing devices and not potential “pains in the neck.”

**Eye Strain** – The most frequent physical complaint by people who spend a lot of time in front of a monitor is eyestrain. Specialists in ergonomics have identified several problem areas and possible corrections for eyestrain, including:

#### Glare

- Move or shield the light source
- Move the monitor and/or change the angle – place at a right angle with a window, if feasible
- Apply a good quality glare filter to the monitor (glass or plastics)

#### Light Brightness Ratio (between the screen and surrounding environment)

- Set the background lighting or source document so that it is not more than 10 times brighter than the screen
- Adjust the screen brightness to match the surrounding room environment
- Work with a light screen background

#### Lighting Levels

- Adjust the screen position and lighting sources to achieve best results
- Avoid high levels of lighting

#### Viewing Distance and Document Height

- Place the monitor and source documents so that there are about the same distance from eyes
- Use a document holder and place the document immediately next to the monitor
- Rest the eye muscles by occasionally focusing on a distant object

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Readability of Screen and Document

- Place monitors and documents so they are perpendicular to the line of sight
- Upgrade or replace monitors with poor resolution or flicker
- Adjust the monitor refresh rate

Vision Correction

- If you wear glasses, consider getting full-frame reading glasses prescribed for a working distance of 20-30 inches which will allow correct placement of the monitor for your vision without stressing posture
- Place the monitor so that the top of the screen is below your line of sight
- Check your vision regularly with a health care professional. Eyestrain could indicate a more extensive vision problem beyond the use of a computer monitor

**Posture Issues** – In addition to cumulative trauma disorders and vision difficulties, back problems are another common complaint during the prolonged use of computer terminals. Poor posture (held for long periods), poorly designed work areas and inappropriately adjusted chairs as well as sustained activity without breaks can all contribute to varying amounts of back, shoulder, and neck pain.

Although personal work habits can contribute to back and shoulder pain, using good posture is not a simple matter of finding the “right” position in which to sit. Even “poor” postures (feet up on chair rungs, slumping, twisting the body into odd positions) can prove comfortable if you do not remain in them for extended periods of time. In fact, shifting about periodically actually proves useful for many people. Ergonomic specialists recommend the following changes to your behavior and work environment to avoid back, neck and shoulder pain:

- Change your body position periodically throughout the day
- Use a document stand to reduce the amount of neck twisting or bending forward if typing from a source document
- Position your keyboard directly in front of you and at approximately elbow height so that you can type with straight wrists. (An adjustable-height keyboard tray may be used)
- Center your monitor with your keyboard and chair
- Avoid ear-to-shoulder neck positioning while on the phone
- Rearrange the work area to avoid excess bending, stooping and reaching
- Try to relax – many injuries and painful episodes arise from continuously tensing your neck and shoulder muscles while working
- Consider increasing the amount of exercise you get, since there seems to be a strong relationship between poor physical condition and workplace injury. Attention to all aspects of your health such as diet, stress management, and weight control is recommended

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**Seating** – A good chair can contribute significantly to reducing the risk of lower back pain or injury. A good ergonomic chair includes all or most of the following characteristics.

- Adjustable lumbar support
- Angle between the backrest and seat that allows one to sit without leaning forward uncomfortably
- Adjustable armrests
- Slightly inclined backrest
- Seat height and seat pan adjustability which allows for a variety of seated postures
- Soft, rounded edges
- A correct size for the individual
- High backrest or headrest for deeply reclining postures
- Comfortable but slip-resistant fabric

If your feet do not reach the floor, consider using a footrest. In addition, if you have an older chair without lumbar support, try using a small pillow or towel roll to relieve pressure on your lower back. Do not get too large a pillow as it may force you to lean forward too much, creating even more strain. Remember that ergonomic features will not help you if the chair does not suit your body or sitting habits. Therefore, adjustability is important.

**Repetition** – As with cumulative trauma disorders, one of the best ways to avoid back, neck, and shoulder injuries is to minimize sustained exertions. The following are good tips:

- Alternate tasks – if possible, get up from the workstation periodically
- Take several rest breaks – use micro breaks (a pause from the task)
- Take short breaks that involve active exercise (walking, stretching) – these are the most effective in relieving stress on the back, neck, and shoulders.

**Other Risks in the Workplace** [from computers] – Other problems posed by continued use of computers and possible solutions include:

- **Heat** – Since computers, monitors, and printers create heat, employers should be sure that the work environment is properly cooled and ventilated. Panels, walls, and furniture should be placed in such a way that they do not block air circulation.
- **Electrostatic Fields** – Besides causing annoying jolts of low-level electricity, constant exposure to static can cause dermatitis [skin inflammation] in some users. Use a grounded keyboard pad or grounded glare screen to reduce static electricity [Several options exist to reduce static.]
- **Electromagnetic Radiation and Magnetic Fields** – Though this is an area of continuing debate, many workers have expressed concerns about continuing exposure to electromagnetic radiation from computers. The focus of research has been on extremely low frequencies, the type of emission from all types of appliances and lighting, not just computers. Although research has not proven that work exposure is harmful in the long run, it is recommended that you should sit at least an arm's length from the back or side of any terminal. Very few emissions come from the front of the monitor.

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**Psychological Stresses** – Stress may be factored into work injuries in two interconnected ways:

- How stress contributes to physical ergonomic problems
- How using a computer contributes to stress

For instance, a stressful work environment may cause you to remain tense for long periods of time, continually use repetitive motions, take fewer breaks, or fail to report work-related medical problems when they arise. In addition, the use of computers, especially by new users, can contribute to this overall feeling of stress. Obviously, these two factors create a cycle that can contribute to pain and injury.

Although employees may not have extensive input into stressful elements of a job (such as the number of staff available to handle the workload), one way to reduce stress is to give personnel awareness of, and control over, ergonomic conditions. Understanding your work environment is essential; so is gaining control over certain aspects of your surroundings, such as user-adjustable chairs and lighting levels. Information and control go a long way to reducing stress levels.<sup>2</sup>

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<sup>2</sup> Information in this article has been paraphrased in part from “*An Ergonomics Approach to Avoiding Workplace Injury*,” a publication of the American Industrial Hygiene Association (AIHA).



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### Ergonomics: FAQs

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#### **What is ergonomics?**

Ergonomics is the study of human work. The term ergonomics comes from the Greek word *ergos* meaning ‘work’ and *nomos* meaning ‘natural laws of.’ Ergonomics is concerned with the effective use of the physical and psychological capabilities of the human as they apply to work. It involves the worker’s interaction with tools, equipment, environment, jobs, tasks, work methods, work rates and other systems.

#### **What is an “ergonomic injury?”**

Input from the recent ergonomics forums demonstrates to OSHA that there are a wide variety of opinions on how the agency should define an ergonomic injury and that the definition adopted by OSHA depends on the context. Ergonomic injuries are often described by the term “musculoskeletal disorders” or MSDs. This is the term of art in scientific literature that refers collectively to a group of injuries and illnesses that affect the musculoskeletal system; there is no single diagnosis for MSDs. As OSHA develops guidance material for specific industries, the agency may narrow the definition as appropriate to address the specific workplace hazards covered.

#### **What is a work-related musculoskeletal disorder (WMSD or MSD)?**

These are disorders of the soft tissues or bones that occur at least partially due to work. Soft tissue disorders may include sprains, strains, inflammation, degeneration, pinching, and tears. Disorders of the bones are typically bruises, micro-fractures, cracks or splintering. These disorders may show up as an employee complaint, injury, illness, discomfort, chronic pain, shooting pain, fatigue, sprain, strain, or as numbness and tingling of hands or feet. Remember, MSDs can and do develop outside the workplace

#### **How long does it take to develop a work-related musculoskeletal disorder?**

This is difficult to predict. An employee may notice symptoms such as muscle, joint or tendon soreness within the first several weeks of a new job. Workers with pre-existing medical problems may be at higher risk of developing symptoms than healthy workers. Some disorders may take several years before symptoms are identified. Too, some employees may never develop a WMSD.

#### **Do back belts prevent low back pain? Should employees be required to wear them? Are back belts considered personal protective equipment?**

Evidence shows that wearing a back belt neither reduces injury rates nor the number of lost workdays. Employees should only be required to wear a back belt as a condition of employment if a physician prescribes it for a previous medical condition. Under no circumstances are back belts considered personal protective equipment.

#### **What is the difference between carpal tunnel syndrome and tendonitis?**

Carpal tunnel syndrome is the entrapment of the median nerve of the hand and wrist in the passageway [tunnel] through the carpal bones of the wrist. It results in symptoms such as pain, tingling and night numbness in the fingers and pain on gripping. Tendonitis is the inflammation of a tendon, usually associated with repetitive, forceful exertions, often involving rotation around a joint such as the wrist or elbow.



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**Will wearing a wrist splint prevent carpal tunnel syndrome?**

No. Although wrist splints help maintain a neutral wrist posture, there is some evidence that they do not change the pressures inside the carpal tunnel. Moreover, wearing a wrist splint in jobs with risk factors may transfer the stress to other parts of the body and cause injury. If the wrist cannot bend easily, and the job still requires wrist flexion, for example, the upper arm orientation has to change. To avoid creating disorders at other body locations, it is necessary to analyze the job requirements and reduce risk factors. Wrist splints are not considered personal protective equipment, and should only be worn if prescribed by a health care provider.

**Is stress a factor in developing work-related musculoskeletal disorders?**

Some studies have shown a relationship between psychosocial factors and WMSDs. Psychosocial factors, such as the amount of control over one's job, appear to play a role. Control over how the job is done is particularly important in situations where the demands of the job are high. Examples are tasks involving quotas or piecework compensation. In these cases, the worker has little control, the job is often highly stressful, and these conditions may contribute to the development and reporting of WMSDs. Supervisory and peer support at work may also be an important factor in helping to reduce risk factors for WMSDs.

**Are work-related musculoskeletal disorders caused by activities people engage in at home [e.g., knitting, gardening, woodcrafts]? Are smoking or obesity potential factors?**

Clearly, risk factors for the development of WMSDs are not found exclusively at work. Home/life activities usually related to recreation or hobbies, such as playing certain string instruments, knitting, carpentry, or playing racquet sports may involve risk factors related to musculoskeletal disorders. There are also personal risk factors that may contribute to these types of disorders. For example, aging, physical health, smoking and obesity are risk factors for the development of WMSDs. However, the employer still should try to eliminate workplace risk factors that contribute to the development or aggravation of WMSDs.

**Is there a difference between men and women in the incidence rate of work-related musculoskeletal disorders?**

There are some differences in the incident rates. However, this may merely reflect differences in employment patterns. For example, the work force in highly repetitive data entry operations [which may create upper extremity problems] is often predominantly female. Therefore, it is difficult to separate the effect of biology from other demographic and economic factors.

**Do stretching exercises help prevent work-related musculoskeletal disorders?**

It is better to modify jobs to eliminate risk factors for disorders than to encourage stretching exercises. However, just like in athletics, stretching can play an important role in preventing, but not eliminating, WMSDs.

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**How frequent and long should rest periods be to prevent work-related musculoskeletal disorders?**

Nobody knows for sure. However, physiological principles suggest that it is better to take short breaks frequently instead of a few breaks of longer duration. Shorter frequent breaks give the tissues of the body time to recover immediately after use. It may be better to think of such breaks as “recovery” breaks rather than “rest” breaks. It is important to design recovery breaks into jobs rather than merely telling employees to take breaks. Unless recovery breaks are a mandatory part of the work process, it is easy for supervisory and peer pressure to discourage taking recovery breaks.

**What is an ergonomic chair?**

Look for adjustability and lumbar back supports. Good chairs should be able to accommodate a wide range of shapes and sizes of people. Probably the most important adjustment is seat pan height. It is also important to have the ability to adjust seat pan angle. A padded support for the low back, which is called a lumbar back support helps reduce the stress on the spine. Before buying a chair, however, it is important to think about the tasks the employee performs and the work environment in which the chair will be used. Specifically, it is critical to remember that work organization affects the amount of time spent sitting in a chair. Organizing the work so that workers can change postures and get up from their chairs may be more important than purchasing the best ergonomic chair available.

**What is an ergonomic computer keyboard?**

Computer keyboard manufacturers have started promoting certain keyboards as “ergonomic.” Although some of this is advertising hype, a number of innovative keyboard designs have been developed. Most serious efforts at redesigning keyboards have centered on minimizing wrist motions and awkward wrist postures. Such designs may reduce risk factors such as wrist deviation. Some of these keyboards have documented improvements in productivity [e.g., typing rates], but little research has been conducted to demonstrate that “ergonomic” keyboards actually prevent injuries. Moreover, it is critical to remember that issues of work organization can significantly affect the amount of time spent keying, which may be the most important factor.

**Why are there so many more work-related musculoskeletal disorder claims now than there were 20 years ago?**

There have been WMSDs for a long time. A physician by the name of Bernardino Ramazzini described them more than 250 years ago. There has been an increase in claims for these disorders over the last several decades. One reason for the increase is changes in production rates. In many industries, competitive pressures consistently increase production line speeds, which increases repetitiveness and reduce rest breaks for tissues to recover. An increase in public awareness may also contribute to an increase in reporting.

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**How heavy is too heavy a load?**

It depends on a variety of factors. For example, a weight held far from the torso is more stressful than one held close to the torso. Lifts from floor level or above the shoulders, and lifts that require a person to twist the body also are more stressful. Lack of, or poorly designed handles on the object also can increase the stresses on the body. Loads should be lighter when lifts are frequent. The National Institute of Occupational Safety and Health (NIOSH) has developed a [Lifting Equation for Manual Materials Handling](#), which provides a method for calculating a recommended maximum weight to be lifted under a variety of conditions.

**If a doctor says an employee cannot perform a job because of work-related musculoskeletal disorders, does the supervisor have any options?**

Yes. Ultimately, the best medicine for injured employees is to return to work as soon as safely possible. Analysis of claims shows that the longer a worker is in the industrial insurance system, the harder it is for that individual to return to work. Companies are encouraged to develop strong return-to-work policies and procedures which provide opportunities for employees who are temporarily disabled due to on-the-job-injuries.<sup>3</sup>

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<sup>3</sup> The content of these FAQs was paraphrased from the Department of Labor & Industries, Washington Industrial Safety and Health Division (WISHA) - 2005.

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Current Research Notes - 2005**

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Research continues to focus on ergonomics. Reducing ergonomic risk factors is still one of the top concerns of employers. Despite the lack of a regulatory driver [from OSHA], research into the causes and conditions of musculoskeletal disorders has not slacked off in recent years. The following are two recent studies which focus on work-related ergonomic issues.

**Women at least twice as likely to get MSDs**

Women are at least twice as likely as men to develop some musculoskeletal disorders (MSDs) of the upper body, according to scientists at Ohio State University. The study also showed that women were more likely than men to develop MSDs even when they have the same job. For more information on the study, visit

<http://researchnews.osu.edu/archive/womenmsd.htm>

**Who is at risk of developing CTS?**

Carpal tunnel syndrome (CTS) is a painful progressive condition caused by compression of a key nerve in the wrist. Approximately two out of every 1,000 employees will experience carpal tunnel syndrome each year, leading to significant medical expenditures and lost time from work. A five-year, \$2.5 million grant from NIOSH may help employers determine which employees are more likely to get carpal tunnel syndrome and other hand, wrist, and elbow problems. The risk of developing carpal tunnel syndrome is not confined to people in a single industry but is seen more often in hand-intensive work requiring frequent task repetition and forceful hand exertions. Jobs that are obviously at higher risk include food processing, manufacturing, and assembly jobs. Personal risk factors such as age, gender, obesity and other diseases also contribute to the risk of developing carpal tunnel syndrome.

*The average lifetime cost of carpal tunnel syndrome, including medical bills and lost time from work, is estimated to be about \$30,000 for each injured worker.*

**H-1112-1 SAFETY AND HEALTH MANAGEMENT**  
**Example – Computer Workstation Assessment Checklist**

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**YES NO**

1. Is the chair adjusted to ensure proper posture, such as:  
☐ ☐ knees and hips bent at approximately 90 degrees  
☐ ☐ feet flat on floor or footrest  
☐ ☐ arms comfortably at sides with elbows at 90-degree angle  
☐ ☐ straight wrist at keyboard
2. Does the chair:  
☐ ☐ adjust easily from the seated position  
☐ ☐ have a padded seat that is adjustable for height and angel  
☐ ☐ have an adjustable backrest  
☐ ☐ provide lumbar support  
☐ ☐ have a table caster base
3. ☐ ☐ Is there sufficient space for knees and feet
4. ☐ ☐ Are the height and tilt of the keyboard work surface adjustable
5. ☐ ☐ Is the keyboard prevented from slipping when in use
6. ☐ ☐ Is the mouse or pointing device at the same level as the keyboard
7. ☐ ☐ Does keying require minimal force
8. ☐ ☐ Is there an adjustable document holder
9. ☐ ☐ Are arm rests provided where needed
10. ☐ ☐ Is the screen clean and free of flickering
11. ☐ ☐ Is the top line of the screen slightly below eye level
12. ☐ ☐ Does the monitor have brightness and contrast controls
13. ☐ ☐ Is the monitor 19 – 30 inches from the employer for viewing
14. ☐ ☐ Is there sufficient lighting without causing glare
15. ☐ ☐ Is an anti-glare screen used if necessary
16. ☐ ☐ Are adequate rest breaks provided for task demands
17. Are high keystroke rates avoided by:  
☐ ☐ job rotation  
☐ ☐ self pacing  
☐ ☐ adjusting the job to the skill of the employee  
☐ ☐ adequate rest pauses

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**Example – Materials Handling Assessment Checklist**

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**YES NO**

1. ☐ ☐ Has excessive weight lifting been reduced
2. ☐ ☐ Are materials moved over minimum distances
3. ☐ ☐ Is the distance between the object and the body minimized
  
4. Are walking surfaces:  
☐ ☐ level  
☐ ☐ wide enough  
☐ ☐ clean and dry  
☐ ☐ well lit
  
5. Are objects:  
☐ ☐ easy to grasp  
☐ ☐ stable  
☐ ☐ able to be held without slipping
6. ☐ ☐ Are there handholds on these objects
7. ☐ ☐ When required, do gloves fit properly
8. ☐ ☐ Is the proper footwear worn
9. ☐ ☐ Is there enough room to maneuver
10. ☐ ☐ Are mechanical aids easily available and used whenever possible
11. ☐ ☐ Are working surfaces adjustable to the best handling heights
  
12. Does material handling avoid:  
☐ ☐ Movements below knuckle height and above shoulder height  
☐ ☐ Static muscle loading  
☐ ☐ Sudden movements during handling  
☐ ☐ Twisting at the waist  
☐ ☐ Excessive reaching
  
13. ☐ ☐ Is help available for heavy or awkward lifts
  
14. Are high rates of repetition avoided by:  
☐ ☐ job rotation  
☐ ☐ self pacing  
☐ ☐ sufficient rest pauses
  
15. ☐ ☐ Are pushing and pulling forces reduced or eliminated
16. ☐ ☐ Does the employee have an unobstructed view of the handling task
17. ☐ ☐ Is there a preventive maintenance program for equipment
18. ☐ ☐ Are employees trained in correct handling and lifting procedures

**Illustration 3-1  
(16.9-3)**

**H-1112-1 SAFETY AND HEALTH MANAGEMENT  
Basic WorkStation Recommendations**

| <b>Chairs</b>   | <b>Keyboard</b>  | <b>Mouse</b>   | <b>Monitor</b>   |
|---|--|--|--|
| Sit in an upright position keeping the back straight  | Place the keyboard on a stable, level surface  | Place the mouse close to the keyboard at the same height or slightly lower                                 | Set the height of the monitor slightly below eye level   |
| Adjust the height of the chair so feet are flat on the floor or on a footrest with the knees bent         | Place the keyboard directly in front of you – not at an angle or in a corner that requires twisting of the torso   | If you use the mouse often, move the keyboard slightly to the side so that you do not over-extend your arm | Place the monitor at least 20 inches directly in front of you  |
| Thighs should be parallel to the floor with the upper to lower leg angle somewhat greater than 90 degrees | Type with the arms hanging straight down from the shoulders, close to the sides with the elbows at about a 90 degree angle so the forearms are parallel to the floor | Do not rely only on the wrist to move the mouse. Keep the wrist straight and use the arm.                  | Position the screen to minimize reflected glare. Use glare screen when necessary   |
| Do not cross the legs for extended periods of time or sit on the feet                                     | Keep shoulders relaxed - not hunched   | Keep arms close to your sides and the elbow bent about 90 degrees  | Keep the screen and filter screen clean of dust and fingerprints   |
| Support the natural inward curve in the lumbar area [lower spine] with the backrest of the chair          | Hold wrists straight while typing. Do not bend or twist wrists up, down or to either side.   | Keep the shoulders relaxed – not hunched   | Contact the IT representative if the screen flickers   |
| The edge of the seat should not press against the back of the knees                                       | Do not over reach for distant keys with the fingers – move the entire hand   |  | Adjust monitor controls [brightness, contrast, etc.] for comfortable viewing   |
|   | Do not rest the wrists, hands, elbows or forearms on hard, sharp-edged surfaces such as the edge of the desk or keyboard. Use a padded wrist rest.                   |  | Place all document holders at the same distance as the monitor and close together to avoid constant changes in focus and excessive neck or back movement |
|   | Do not pound the keyboard. This excessive force creates shock waves that must be absorbed by the hands and arms  |  |  |
|   | Adjust the keyboard angle to fit your hands. If you have long fingers, you probably will be more comfortable keeping the keyboard flat or at a very low angle.       |  |  |

**H-1112-1 SAFETY AND HEALTH MANAGEMENT  
Safety Guidelines for the Home Work Space**

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The following information is taken from the Interagency Telework Guide which can be referenced at the following site: [http://www.telework.gov/documents/tw\\_man03/tw\\_man.asp](http://www.telework.gov/documents/tw_man03/tw_man.asp)

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Participating employees may use the following guidelines to assist them in a survey of the overall safety and adequacy of their alternate worksite. The following are only recommendations, and do not encompass every situation that may be encountered. Employees are encouraged to obtain professional assistance with issues concerning appropriate electrical service and circuit capacity for residential worksites.

1. Develop and practice a fire evacuation plan for use in the event of an emergency.
2. Check your smoke detectors regularly and replace batteries once a year.
3. Always have a working fire extinguisher conveniently located in your home, and check the charge regularly.
4. Computers are heavy. Always place them on sturdy, level, well maintained furniture.
5. Choose office chairs that provide good supporting backrests and allow adjustments to fit you comfortably.
6. Locate your computer to eliminate noticeable glare from windows and lighting. Place the computer monitor at a height which is comfortable and does not produce neck or back strain. Locate computer keyboards at heights that do not cause wrist strain or place the keyboard on an adjustable surface.
7. Install sufficient lighting in locations to reduce glare on the work surface.
8. Arrange file cabinets so that opened drawers do not block aisles.
9. Be sure to leave aisle space, where possible, to reduce tripping hazards.
10. Always make sure electrical equipment is connected to grounded outlets.
11. Avoid fire hazards by never overloading electrical circuits.
12. Inspect and repair carpeting with frayed edges or loose seams. Avoid using throw rugs that can cause tripping hazards in your workspace.
13. Locate computers, phones, and other electrical equipment in a manner that keeps power cords out of walkways.
14. Always power down computers after the workday is over and turn off all electrical equipment during thunderstorms.
15. Keep your work area clean and avoid clutter which can cause fire and tripping hazards.
16. Do not allow non-Government employees to operate or repair Government-owned equipment.
17. Always keep Government files and information in a secure place and do not advertise your home office to strangers.
18. Always use proper lifting techniques when moving or lifting heavy equipment and furniture.
19. Always report accidents and injuries immediately to your supervisor.